

# **NASA Technical Memorandum 80211**

**PUBLICATIONS IN ACOUSTICS AND NOISE CONTROL  
FROM THE NASA LANGLEY RESEARCH CENTER  
DURING 1940-1979**

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**National Aeronautics and  
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## Foreword

This document contains reference lists of published Langley Research Center papers in various areas of acoustics and noise control for the period 1940-1979. The research work was performed either in-house by the Center staff or by other personnel supported entirely or in part by grants or contracts. The references are listed chronologically and are grouped under the following general headings:

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Included are the generally available NACA and NASA Technical Reports (R-1), NACA and NASA Technical Notes (TN- and TN D-), NACA Research Memorandum (RM-), Contractor Reports (CR-), and Journal Articles, copies of which can be obtained from the NASA Scientific and Technical Information Facility (STIF), P. O. Box 8757, Baltimore/Washington International Airport, Maryland 21240, for a nominal charge. Other publications such as NACA Technical Memorandums (TM-), NASA Memorandums and Technical Memorandums (TM- and TM X-), are produced in limited supply but reproduction copies will in most cases also be available from STIF.

Langley Working Papers (LWP-), Masters and Doctoral Theses, and company reports are generally not available from STIF. In nearly all cases the supply is limited and copies have to be requested directly from the authors.

## I. DUCT ACOUSTICS

Some of the topics covered in this section are as follows:

Reciprocating Engine Mufflers

Jet Engine Inlet and Discharge Duct Acoustic Liners

Propagation in Flowing Ducts

Liner Configurations and Materials

Helmholtz Resonators

Acoustic Impedance and Flow Resistance

Measurements and Analyses

Facilities and Test Equipment

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## II. PROPAGATION AND OPERATIONS

Some of the topics covered in this section are as follows:

Atmospheric Propagation of Sound and Shock Waves

Absorption, Scattering, Refraction, Diffraction, and  
Reflection

Turbulence and Wind Effects

Aural Detection

Noise Abatement Aircraft Operations

Ground Impedance

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### III. ROTATING BLADE NOISE

Some of the topics covered in this section are as follows:

Free and Ducted Propellers; Tilt Rotors; Main and Tail  
Rotors of Helicopters

Noise due to Torque, Thrust, Coning, Thickness, Unsteady  
Loads, and Vortex Shedding and Nonuniform Inflow

Near- and Far-Field Noise Measurement, Analysis, Prediction,  
and Reduction

Rotating Blade Induced Loads on Structures

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#### IV. JET NOISE

Some of the topics covered in this section are as follows:

Near- and Far-Noise Fields

Subsonic and Supersonic Flows

Model Jets, Jet Engines, and Rocket Engines

Free Jets, Shear Layers, Impinging Jet and Coaxial Jets

Mach Waves, Turbulence, Temperature and Velocity Profiles,  
and Combustion

Mufflers, Suppressors, and Noise Control

Equipment, Facilities, and Test Methodology

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## V. SONIC BOOM

Some of the topics covered in this section are as follows:

Generation, Propagation, Minimization, and Prediction

Effects of Vehicle Altitude, Mach Number, Size and Shape,  
Lift Distribution, Flightpath, and Acceleration

Generation by Projectiles, Aircraft, and Spacecraft

Ballistic Ranges, Rocket Sleds, Wind Tunnels, and Other  
Simulators

Effects of Atmospheric Gradients, Turbulence, and Ground  
Reflections

Lateral Spread Ground Patterns Including Super-Booms from  
Maneuvers

Measurements and Analyses

Responses of Buildings, Building Components, Equipment, and  
Terrain

Loudness, Startle, Awakening and Annoyance Responses of  
People

## V. SONIC BOOM

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## VI. AIRFLOW-SURFACE INTERACTION NOISE

Some of the topics covered in this section are as follows:

Turbulent Boundary Layers; Separated Flows; and Impinging  
Jet Flows from Upper Surface Blowing, Jet Augmented Flaps,  
and Externally Blown Flaps

Noise from Airframes Including Such Components as Struts,  
Cavities, Spoilers, Flaps, and Porous Surfaces

Free-Flight Tests and Simulation by Wind Tunnels and  
Tracked Vehicles

Lift Induced Ground Pressures

Radiated Noise, Surface Pressures, Correlation Areas, and  
Vorticity

## VI. AIRFLOW-SURFACE INTERACTION NOISE

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## VII. STRUCTURAL RESPONSE/INTERIOR NOISE

Some of the topics covered in this section are as follows:

Noise and Sonic Boom Induced Responses of Panels, Beams,  
Windows, Walls, Cavities, Ground Buildings, Aircraft  
Structures, and Acoustic Materials.

Deflections, Accelerations, Stresses, and Crack Growth

Damage Minimization

Modal Density Concepts

Acoustic Loads Prediction

Test Facilities, Equipment, and Methods

Noise Transmission Through Plates and Enclosures

Noise Insulation

Aircraft and Helicopter Cabin Noise Measurement  
Analysis and Control

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## VIII. HUMAN RESPONSE

Some of the topics covered in this section are as follows:

Aircraft Noise, Sonic Boom, and Vibration Environments

Psychoacoustic and Psychophysiological Responses Such as  
Annoyance, Noisiness, Loudness, Speech Interference,  
Task Performance, Muscle Tension, Startle, Sleep Awakening

Research Methods, Equipment, and Facilities

Measurements, Analysis, and Prediction

Ride Quality Criteria

Combined Effects of Noise and Vibrations

## VIII. HUMAN RESPONSE

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## IX. AIRCRAFT NOISE PREDICTION

Items covered in this section are:

Programs and Methodology for predicting aircraft flyover noise

Technology relating to the noise generation, noise propagation or the effects of noise from components of flight vehicles

Validation of prediction methods

Key Technology Prediction Documents from NASA Research Centers other than Langley

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## X. MISCELLANEOUS

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Procedures for measurement, data reduction  
and calibration

Analytical methods

Special items

## X. MISCELLANEOUS

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